

Notice of Allowability

Application No.

09/822,512

Applicant(s)

HACHIYA, KOUTARO

Examiner

Fred Ferris

Art Unit

2128

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 2 February 2006.
2. ☒ The allowed claim(s) is/are 1-16.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some* c) ☐ None of the:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.


Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☒ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
- (b) ☒ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date 02242006.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date 02242006
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date _____.
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.


Primary Examiner

DETAILED ACTION

1. *Claims 1-16 have been presented for examination based on applicant's amendment 2 February 2006. Claims 1-16 have now been allowed over the prior art of record.*

Response to Arguments

2. *Applicant's arguments filed 2 February 2006 have been fully considered and found to be persuasive.*

Regarding applicant's response to 112(1) rejection: The examiner withdraws the 112(1) rejection in view of applicant's amendment to the claims.

Regarding applicant's response to 103(a) rejection: The examiner withdraws the 103(a) rejection in view of applicant's amendment to the claims of 2 February 2006 and arguments submitted 17 August 2005 and 2 February 2006.

Regarding proposed drawing changes: The proposed drawing changes submitted 31 January 2005 and previously approved by the examiner now require updating to reflect newly amended claims. Specifically Figure 1, S202 should now read "determining means" instead of determinator and Figure 1, S203 should now read "replacing means" instead of replacer. Applicants have agreed to submit new formal drawings responsive to these changes. (See: Interview Summary 24 February 2006).

Allowable Subject Matter

3. *Claims 1-16 are allowed over the prior art of record.*

The following is an examiner's statement of reasons for allowance:

Applicants are disclosing a computer implemented method and apparatus for reordering the elements of a coefficient matrix representing linear simultaneous equations by determining combinations of rows and columns from the coefficient matrix and using Gaussian elimination in solving linear simultaneous equations. This has been disclosed in the prior art of record.

However, the prior art does not disclose the specific combination of elements inclusive of reordering based on a number of non-zero elements included in the coefficient matrix and an accumulative processing time (or critical path length) of the Gaussian elimination as required by independent claims 1, 2, 5-8, and 11-12. (See specification: page 7, line 11 to page 12, line 5, Figs 1&2, for example). Independent claim 13 further requires selecting among pivots included in the coefficient matrix whose degree corresponds to a number of non-zero elements and whose critical path length is minimum. (See: Fig. 2, for example)

*Independent claims 5, 6, 11, and 12 also include "means for" language and are given deference in view of *In re Donaldson* and interpreted in view of 35 U.S.C. § 112 paragraph 6. The "means for" language and the limitations related thereto of claims 5, 6, 11, and 12 are interpreted within the scope of enablement as provided within the relative embodiment provided within applicant's specification. Specifically the determining means for and replacing means for are interpreted as disclosed within the embodiment of applicant's specification on page 7, line 11 to page 12, line 5 and in Figures 1 and 2.*

The closest prior art uncovered during examination teaches certain limitations of the claimed invention as follows:

U.S. Patent 6,601,080 issued to Garg: teaches reordering to the elements of a coefficient matrix (Abstract, CL5-L29-37, Fig. 2) that represent linear simultaneous equations and determining combinations of rows and columns from the coefficient matrix including Gaussian distribution but does not disclose the specific combination of elements including reordering based on a number of non-zero elements included in the coefficient matrix and an accumulative processing time (or critical path length / pivots) of the Gaussian elimination as required by the present invention.

"On Efficient Band Matrix Arithmetic", W. Eberly: discloses simulating the operation of an electronic circuit by parallel processing and using a coefficient matrix for solving simultaneous linear equations but again does not disclose the specific combination of elements including reordering based on a number of non-zero elements included in the coefficient matrix and an accumulative processing time (or critical path length / pivots) of the Gaussian elimination as required by the present invention.

The specific combination of elements noted above therefore renders the claimed invention non-obvious over the prior art of record. Dependent claims 3, 4 and 9, 10, and 14-16 are deemed allowable as depending from independent claims 1, 2, 7, 8, and 13 respectively.

It is further noted that the examiner has given patentable weight to the preamble of independent claims 1, 2, 5-8, and 11-13 since, in this case, the preamble limits the body of the claims. MPEP 2163 recites the following:

“The examiner should evaluate each claim to determine if sufficient structures, acts, or functions are recited to make clear the scope and meaning of the claim, including the weight to be given the preamble. See, e.g., Bell Communications Research, Inc. v. Vitalink Communications Corp., 55 F.3d 615, 620, 34 USPQ2d 1816, 1820 (Fed. Cir. 1995) (“[A] claim preamble has the import that the claim as a whole suggests for it.”); Corning Glass Works v. Sumitomo Elec. U.S.A., Inc., 868 F.2d 1251, 1257, 9 USPQ2d 1962, 1966 (Fed. Cir. 1989) (The determination of whether preamble recitations are structural limitations can be resolved only on review of the entirety of the application “to gain an understanding of what the inventors actually invented and intended to encompass by the claim.”).”

In this case, the preamble recitation of method and apparatus for “matrix reordering for reordering elements of a coefficient matrix whose structure corresponds to coefficients of linear simultaneous equations whose solutions are to be produced by parallel processing of processors of a computer in accordance with Gaussian elimination” is further defined in the body of the claim as “based on the number of non-zero elements in the coefficient matrix”, and an “accumulative processing time (or critical path length) for the Gaussian distribution”, and further requires performing “replacement of elements between combinations (1st and 2nd) of rows and columns within the coefficient matrix”, and subsequently “using the coefficient matrix for solving the linear simultaneous equations”.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled “Comments on Statement of Reasons for Allowance.”

Conclusion

4. *Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fred Ferris whose telephone number is 571-272-3778 and whose normal working hours are 8:30am to 5:00pm Monday to Friday. Any inquiry of a general nature relating to the status of this application should be directed to the group receptionist whose telephone number is 571-272-3700. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamini Shah can be reached at 571-272-2279. The Official Fax Number is: (703) 872-9306*

Fred Ferris, Primary Examiner
Simulation and Emulation, Art Unit 2128
U.S. Patent and Trademark Office
Randolph Building, Room 5D19
401 Dulany Street
Alexandria, VA 22313
Phone: (571-272-3778)
Fred.Ferris@uspto.gov
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Fred Ferris
Primary Examiner
AU 2128